What is claimed is:

1. A magnetic resonance imaging system comprising:

MT-pulse applying means for applying to an object an MT pulse of which is off-resonance to a region to be imaged of the object;

spoiler applying means for applying a gradient spoiler pulse to the object after the MT pulse is applied; and

scanning means for performing a scan to acquire an echo signal from the region to be imaged after the gradient spoiler pulse is applied,

wherein a duration of the MT pulse is set to a short time.

2. The magnetic resonance imaging system according to claim 1, wherein the duration of the MT pulse is less than 10 [msec].

3. The magnetic resonance imaging system according to claim 2, wherein the duration of the MT pulse is 6 [msec] or less.

4. The magnetic resonance imaging system according to claim 1, wherein the MT pulse is, in a waveform area, approximately equal to a conventional MT pulse of which duration is longer.

5. The magnetic resonance imaging system according to claim 1, wherein the MT pulse is, in a waveform area, less than a conventional MT pulse of which duration is longer.

6. The magnetic resonance imaging system according to

claim 1, wherein the scanning means is configured to two-dimensionally scan the region to be imaged on the basis of multi-slice imaging.

7. The magnetic resonance imaging system according to claim 1, wherein the scanning means is configured to three-dimensionally scan the region to be imaged on the basis of multi-slice imaging.

8. The magnetic resonance imaging system according to claim 7, further comprising region selecting means configured to apply, concurrently with the application of the MT pulse, a gradient pulse to select an applied position of the MT pulse to the object so that the applied position of the MT pulse is different from the region to be imaged.

9. A magnetic resonance imaging system comprising:

MT-pulse applying means for applying to an object an MT pulse of which is off-resonance to a region to be imaged of the object;

spoiler applying means for applying a gradient spoiler pulse to the object after the MT pulse is applied; and

scanning means for performing a scan to acquire an echo signal from the region to be imaged after the gradient spoiler pulse is applied,

wherein a duration of the MT pulse is set to a short time during which relaxation of a spin-lattice magnetization of a magnetic spin of the object is hardly completed.

10. The magnetic resonance imaging system according to claim 9, wherein the duration of the MT pulse is less than 10 [msec].

11. The magnetic resonance imaging system according to claim 10, wherein the scanning means is configured to two-dimensionally scan the region to be imaged on the basis of a multi-slice technique.

12. The magnetic resonance imaging system according to claim 10, wherein the scanning means is configured to three-dimensionally scan the region to be imaged on the basis of a multi-slice technique.

13. The magnetic resonance imaging system according to claim 12, further comprising region selecting means configured to apply, concurrently with the application of the MT pulse, a gradient pulse to select an applied position of the MT pulse to the object so that the applied position of the MT pulse is different from the region to be imaged.

14. A magnetic resonance imaging method for acquiring an echo signal on the basis of magnetic resonance phenomena of at least two types of nuclear pools in an object, the two types of nuclear pools being mutually coupled though a coupling relationship based on at least one of a chemical exchange phenomenon and a cross relaxation phenomenon, the method comprising the steps of:

decoupling the coupling relationship between the at least

two types of nuclear pools by applying to the object an MT pulse of which duration is short;

applying a gradient spoiler pulse to the decoupled nuclear pools; and

acquiring the echo signal from a region to be imaged of the object.

15. The magnetic resonance imaging method according to claim 14, wherein the two types of nuclear pools consist of a nuclear pool of free water and a nuclear pool of a macromolecule.

16. The magnetic resonance imaging method according to claim 15, wherein the echo signal from the region to be imaged is acquired by a two-dimensional scan based on multi-slice imaging.

17. The magnetic resonance imaging method according to claim 15, wherein the echo signal from the region to be imaged is acquired by a three-dimensional scan based on multi-slice imaging.

18. The magnetic resonance imaging method according to claim 17, wherein, concurrently with the application of the MT pulse, a gradient pulse is applied to the object so as to select an applied position of the MT pulse to the object so that the applied position of the MT pulse is different from the region to be imaged.

19. The magnetic resonance imaging method according to claim 14, wherein the duration of the MT pulse is less than 10

[msec].